

An updated diagnosis for *Eucalyptus* series *Accedentes* (Myrtaceae) and a new mallee species for the series occurring in far western Australia

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Abstract

Nicolle, D. & Brooker, M.I.H. An updated diagnosis for *Eucalyptus* series *Accedentes* (Myrtaceae) and a new mallee species for the series occurring in far western Australia. *Nuytsia* 18: 189–196 (2008). *Eucalyptus* L'Hér. ser. *Accedentes* Chippend. is diagnosed by an exclusive combination of characters for the first time. The series consists of nine species, all but one of which are endemic to Western Australia, including the newly described *Eucalyptus baiophylla* D.Nicolle & Brooker, a mallee occurring between Exmouth and Carnarvon on the west coast of Australia. The new species was formerly included in *E. prominens* Brooker and is most closely related to *E. zopherophloia* Brooker & Hopper. A key to the series is included and a map and illustrations of the new species are provided.

Introduction

We here recognize nine species within *Eucalyptus* L.'Hér. ser. *Accedentes* Chippend., viz. *E. accedens* W.Fitzg., *E. laeliae* Podger & Chippend., *E. leprophloia* Brooker & Hopper, *E. pilbarensis* Brooker & Edgecombe, *E. prominens* Brooker, *E. pruiniramis* L.A.S.Johnson & K.D.Hill, *E. trivalva* Blakely, *E. zopherophloia* Brooker & Hopper and the new species *E. baiophylla* D.Nicolle & Brooker *sp. nov.* Of these taxa, the well-known powderbark wandoo, *E. accedens*, was the first to be published and also represents the type species of the series. *Eucalyptus accedens* occurs on the higher parts of the Darling Range of southern Western Australia and is one of two notably smooth-barked eucalypt tree species widespread in the Range. The other species is the more widespread *E. wandoo* Blakely of *E. ser. Levispermae* Maiden. The two species are not closely related, although they share the common name wandoo.

The natural affinity of *E. accedens* was not recognised by early botanists. Maiden (1920) suggested an affinity with *E. redunca* Schauer (the name generally then attributed to *E. wandoo*), with *E. foecunda* Schauer (*E. ser. Porantherae* Benth.) and with *E. incrassata* Labill. (*E. sect. Dumaria* L.D.Pryor & L.A.S.Johnson ex Brooker). These three species are not closely related to *E. accedens* and belong to unrelated taxonomic series.

Blakely (1934) was clearly uncertain of the taxonomic position of *E. accedens* and placed it in the large *E. ser. Dumosae* Blakely, which comprised a considerable mixture of species recognised later to belong to several other series. *Eucalyptus ser. Dumosae* is typified by *E. dumosa* A.Cunn. ex Oxley and is characterised, among other characters, by reniform cotyledons compared to the bisected cotyledons of *E. accedens* and of two of the three species mentioned above.

Podger and Chippendale (1969), in publishing *E. laeliae*, stated that its natural affinity was with *E. accedens* with which it had been previously confused. Both species are smooth-barked trees, but the former has a more restricted distribution on the higher parts and western side of the central and southern Darling Range, including Mt Cooke, the highest point in the range.

Pryor and Johnson (1971) published their comprehensive but informal classification of the genus *Eucalyptus*, where they informally erected *E. ser. Accedentes* to accommodate *E. accedens*, *E. laeliae* and *E. trivalva*, the last-named species having also been incorrectly placed by Blakely (1934) in series *Dumosae*. Pryor and Johnson (1971) gave no diagnoses for their newly erected series.

Eucalyptus prominens occurs on Cape Range, west of Exmouth Gulf. Brooker (1976) provided no discussion of affinities apart from stating that the new species was related to *E. trivalva*. The species newly described here, which has long been included in *E. prominens*, was first collected in the 1970s south of Exmouth Gulf.

Eucalyptus pilbarensis is a mallee from the higher parts of the Pilbara region of central northern Western Australia. Brooker and Edgecombe (1986: 377, 380) stated that 'the simple axillary inflorescences bi-operculate buds, oblong anthers, bisected cotyledons, glandular pith, non-waxy, straight-sided fruit, and elliptical to ovate seed with a shallow reticulum place *E. pilbarensis* in *E. subgenus Symphyomyrtus* sect. *Bisectaria* series *Accedentes* of the informal classification of Pryor and Johnson (1971).' This account was the first description of the series, but lacked comparisons with related taxa.

Chippendale (1988) published the *Flora of Australia* treatment of the genus *Eucalyptus*. This was the first formal comprehensive statement on the taxonomy of the genus since Blakely (1934). In this work Chippendale erected *E. ser. Accedentes* without acknowledgement of the informal publication of the name by Pryor and Johnson (1971). The publication was formalised by a description in Latin only (Chippendale 1988, p. 495), with the English description of *E. ser. Accedentes* provided elsewhere in Chippendale's treatment of *Eucalyptus* (Chippendale 1988, p. 230). Both the Latin and English descriptions of the series provided by Chippendale (1988) did not include reference to related series nor provide an exclusive combination of characters for *E. ser. Accedentes*.

Eucalyptus pruiniramis is a poorly formed tree or mallee of very restricted distribution from Arrino and Mogumber north of Perth. It has some rough bark, white waxy branchlets, and large buds and fruits, which distinguish it from *E. accedens*. Hill and Johnson (1992) placed the species in *E. ser. Accedentes*, which was given a minimal diagnosis. The following year Brooker and Hopper (1993) described *E. leprophloia* and *E. zopherophloia* and placed both in *E. ser. Accedentes*. These authors described a relatively restricted distribution, between Arrowsmith and White Point, for *E. zopherophloia* (Brooker & Hopper 1993).

Brooker (2000) gave a brief description of the series *Accedentes* in which he introduced a further character, the flanged seeds. Our observations indicate that this character is at best variable in the series, and cannot be regarded as diagnostic.

Taxonomy

Eucalyptus* ser. *Accedentes Chippend., *Fl. Austral.* 19: 495 (1988). *Type: Eucalyptus accedens* W.Fitzg.

Lignotubers present; essential oil 4-methyl-2-pentyl acetate (MPA) absent; pith glands present; cotyledons bisected; seedling leaves petiolate, disjunct after a few pairs; inflorescences axillary, single, held erect; stamens white, inflexed in bud; style tapering towards top and not articulate at base; ovules in 4 vertical rows; seeds grey-brown, compressed-ovoid to compressed-spherical, nearly smooth.

A series of nine species, eight of which are endemic to Western Australia and one (*E. trivalva*) with a widespread distribution in arid regions of Western Australia, south-east to Lake Gairdner in western South Australia and in the southern Northern Territory.

Further subdivision of the series into natural subspecies is not considered feasible based on available data and knowledge of the series.

Eucalyptus ser. *Accedentes* is part of the large, predominantly southern Australian *E.* sect *Bisectae* Maiden ex Brooker. The section is diagnosed exclusively by bisected cotyledons, although the monophyly of the section has been questioned (Steane *et al.* 2002). We regard that *E.* ser. *Accedentes* is most closely related to the following series: *E.* ser. *Elongatae* Blakely (five taxa) which differs in the erect or pendulous inflorescences, white, yellow or red staminal filaments, and ovules in six or eight vertical rows; *E.* ser. *Loxophlebae* Chippend. (seven taxa) which differs in the variable presence of essential oil 4-methyl-2-pentyl acetate and narrowed or articulate style base; *E.* ser. *Stricklandianae* Brooker (two taxa) which differs in the absence of a lignotuber, variable presence of essential oil MPA, yellow staminal filaments and red-brown seeds; and the monotypic *E.* ser. *Obliquae* Blakely (*E. grossa* F.Muell.) which differs in the yellow staminal filaments, rigidly down-turned inflorescences, and ovules in six vertical rows.

Key to the taxa of *Eucalyptus* series *Accedentes*

1. Tree; bark completely smooth
 2. Adult leaves greyish; flower buds 4–7 mm long **E. accedens**
 - 2: Adult leaves green; flower buds 4–5 mm long **E. laeliae**
- 1: Mallee (rarely a poorly-formed tree with some rough bark); bark smooth or rough
 3. Adult leaves 15–40 mm wide, dull and bluish; branchlets pruinose or not
 4. Flower buds 14–17 mm long; fruit 10–12 mm long **E. pruiniramis**
 - 4: Flower buds 7–11 mm long; fruit 5–9 mm long **E. trivalva**
 - 3: Adult leaves 4–20 mm wide, dull or glossy, green to slightly bluish; branchlets never pruinose
 5. Bark smooth or mostly smooth
 6. Fruit cupular to cylindrical; valves to rim level **E. pilbarensis**
 - 6: Fruit obconical; valves exserted **E. prominens**
 - 5: Bark rough on lower stems
 7. Juvenile leaves linear; adult leaves 4–7(–9) mm wide **E. baiophylla**
 - 7: Juvenile leaves ovate to lanceolate; adult leaves 7–25 mm wide
 8. Bark rough over most of stems, tightly held **E. zopherophloia**
 - 8: Bark rough over lower stems only, loosely held **E. leprophloia**

Eucalyptus baiophylla* D.Nicolle & Brooker, *sp. nov.

A *Eucalypto prominenti* Brooker cortice aspero in caulibus inferioribus, foliis juvenilibus angustioribus, adultis angustioribus generaliter minoribus, alabastris minoribus, fructibus minus obconicis valvis minus exsertis, et habitone inferiore differt.

Typus: 48 km from Highway 1 on road to Exmouth, Western Australia, 28 October 1983, *K. Hill* 398, *L. Johnson*, *D. Blaxell*, *M.I.H. Brooker* & *W. Edgecombe* (*holo*: PERTH 01365274; *iso*: CANB, NSW).

Eucalyptus sp. Giralia Range (M.E. French 195), Western Australian Herbarium, in *FloraBase*, <http://florabase.dec.wa.gov.au> [accessed January 2008].

Eucalyptus giraliensis L.A.S.Johnson ms, in Council of Heads of Australasian Herbaria, *Australian Plant Census*, <http://www.chah.gov.au/apc/index.html> [accessed January 2008]; in G. Paczkowska & A.R. Chapman, *West. Austral. Fl.: Descr. Cat.* p. 371 (2000).

Eucalyptus prominens subsp. *galea* D.Nicolle ms, in Council of Heads of Australasian Herbaria, *Australian Plant Census*, <http://www.chah.gov.au/apc/index.html> [accessed January 2008].

Differs from *E. prominens* in the rough bark on the lower stems, the narrower juvenile leaves, the narrower and generally smaller adult leaves, the smaller flower buds, the less obconical fruits with less exerted valves, and the low-land habitat.

Mallee, often of sprawling and at times decumbent habit, 1–4 metres tall; lignotuber present. *Bark* rough on lower parts to all of stems, loose-fibrous. *Seedling leaves* becoming disjunct after a few pairs, linear, to 75 mm long × 6 mm wide, dull, blue-green. *Adult leaves* petiolate, held erect; lamina concolorous, dull to moderately glossy, green, linear, 50–85 mm long × 4–7(–9) mm wide. *Inflorescences* axillary, unbranched, held erect, 5–7-flowered; peduncles angular to slightly flattened and distally broadened, 3–6 mm long; pedicels slightly angular, 0.5–2 mm long. *Flower buds* ovoid, 7–9 mm long × 3.5–4.5 mm wide; opercula hemispherical to bluntly conical, equal in length to hypanthia. *Flowers* white; all stamens fertile. *Fruits* obconical to somewhat barrel-shaped, 5–9 mm long × 6–10 mm wide; disc descending, 1–2 mm wide; valves (3)4, slightly below rim level to slightly exerted. *Seeds* brown, compressed-ovoid to compressed-spherical, slightly flanged, with a shallow reticulum. (Figure 1)

Selected specimens. WESTERNAUSTRALIA: c. 5 km west of Giralia homestead, 24 Apr. 1974, *M.I.H. Brooker* 4569 (AD, CANB, PERTH); 20 km N of Warroora r/o [Warroora t/o] on new Exmouth road, 14 Apr. 1977, *M.I.H. Brooker* 5687 (AD, CANB, NSW, PERTH); 12 km N of Warroora turnoff on Coral Bay Road, 15 Apr. 1977, *M.I.H. Brooker* 5697 (PERTH); road to Exmouth, NW of Minilya Bridge, 28 Oct. 1983, *M.I.H. Brooker* 8306 (AD, CANB); Warroora Station, Exmouth Road, 6 July 1997, *M.E. French* 195 (PERTH); Warroora Station, Exmouth Road, 6 July 1997, *M.E. French* 196 (PERTH); Warroora Station 5 km ex Exmouth Road ex NTA, 6 July 1997, *M.E. French* 199, 200 (PERTH); 27.7 km E of main Exmouth road on track to Giralia (10.1 km W of homestead), 29 Oct. 1983, *K. Hill* 416, *L. Johnson*, *D. Blaxell*, *M.I.H. Brooker* & *W. Edgecombe* (AD, CANB, NSW, PERTH); 10.4 km W of the Giralia Homestead entrance on the Burkett Road, 3 Aug. 1986, *S.D. Hopper* 5053 (PERTH); Giralia Range, 10.5 km W of 'Giralia' homestead on road to 'Bullara', 4 Aug. 1991, *L.A.S. Johnson* 9354 & *B.G. Briggs* (CANB, NSW, PERTH); near Cape Farquhar, on coastal track between Gnaraloo and Warroora Stations, 28 Nov. 1994, *D. Nicolle* 1181 (CANB, PERTH); Cardabia Station, 17 June 1981, *A. Payne* 66 (PERTH); Quobba Station, 26 Nov. 1981, *A. Payne* 196 (PERTH).



Figure 1. Holotype of *Eucalyptus baiophylla* (K. Hill 398, L. Johnson, D. Blaxell, M.I.H. Brooker & W. Edgewcombe), scale = 5 cm

Distribution and habitat. Of widespread but relatively scattered distribution centered about the Giralda Range between Exmouth Gulf and Lake MacLeod, in far western Australia (Figure 2). The species occurs on red or white sand or loam over limestone, often on low stony rises (Figure 3), where it is often the only eucalypt species present, although it has been recorded to be associated with *E. fruticosa* Brooker.

Conservation status. *Eucalyptus baiophylla* is scattered in a relatively remote area and is not considered to be at risk. It has not been recorded from any national parks or nature reserves. Populations of mallees in Kalbarri and Zuytdorp National Parks, variously attributed to *E. prominens* (Kelly *et al.* 1995) or this new species are considered here to represent a northern extension to the distribution of *E. zopherophloia* (see below), and appear typical for that species.

Etymology. The specific name is derived from the Greek *baios* (little) and *phyllon* (a leaf), and refers to the small juvenile and particularly adult leaves of this species in contrast to the related *E. zopherophloia* and *E. prominens*.

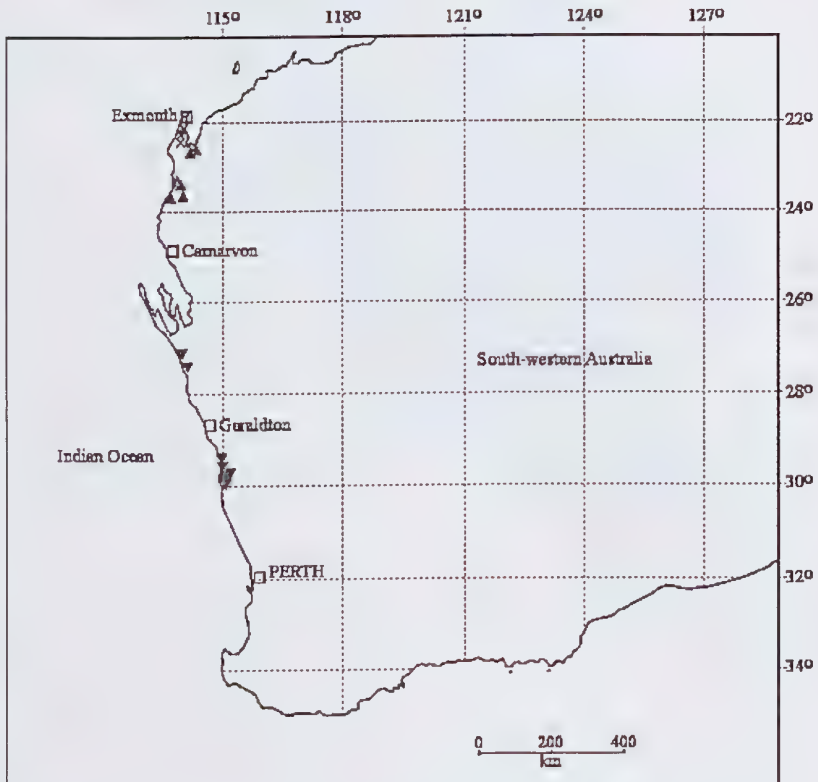


Figure 2. Distribution of *Eucalyptus baiophylla* (▲), *E. zopherophloia* (▼) and *E. prominens* (×) in south-western Australia.



Figure 3. *Eucalyptus baiophylla* habit and habitat (D. Nicolle 1181; near Cape Farquhar, on coastal track between Gnaraloo and Warroora Stations).

Notes. The new species appears to link *E. prominens* with *E. zopherophloia*, both morphologically (as evidenced by some degree of intermediacy of characters) and geographically (Figure 2).

Eucalyptus baiophylla was included in *E. prominens* by Brooker and Kleinig (2004). It differs from *E. prominens* in the often lower, more sprawling habit, the rough bark on the lower stems (mostly smooth-barked in *E. prominens*), the shorter and narrower juvenile leaves (to 110 mm long and to 14 mm wide in *E. prominens*), the narrower and often shorter adult leaves (8–20 mm wide and 70–120 mm long in *E. prominens*), the smaller buds (8–13 mm long and 5–7 mm wide in *E. prominens*) and the often less obconical fruits with less exerted valves (always obconical and valves strongly exerted in *E. prominens*). *Eucalyptus prominens* is of more restricted distribution than *E. baiophylla*, occurring only near Exmouth where it occurs on the higher ground of the limestone slopes and plateaux of the Cape Range, in contrast to the lowland habitat of the new species.

Although commonly included in *E. prominens*, *E. baiophylla* is considered here to be more closely related to *E. zopherophloia*. It differs from *E. zopherophloia* in its linear juvenile leaves (lanceolate to broad-lanceolate in *E. zopherophloia*), narrower and often shorter adult leaves (7–14 mm wide and 60–100 mm long in *E. zopherophloia*), generally shorter peduncles (to 13 mm long in *E. zopherophloia*) and pedicels, and more prominent valves of the fruit (valves to rim level in *E. zopherophloia*). *Eucalyptus zopherophloia* is of a more southern distribution, occurring from near Dongara northwards to the Zuytdorp Cliffs, where it occurs on coastal sands over limestone, similar to the habitat of *E. baiophylla*. The inclusion of populations from Kalbarri and Zuytdorp National Parks (north of Geraldton) in *E. zopherophloia* considerably extends the distribution of the species, which was previously only known from between Arrowsmith and White Point (south of Geraldton; Brooker & Hopper 1993).

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